

A quota is a quantity restriction, usually on imports, but it could be on exports. (tariffs could be thought of as price restrictions)

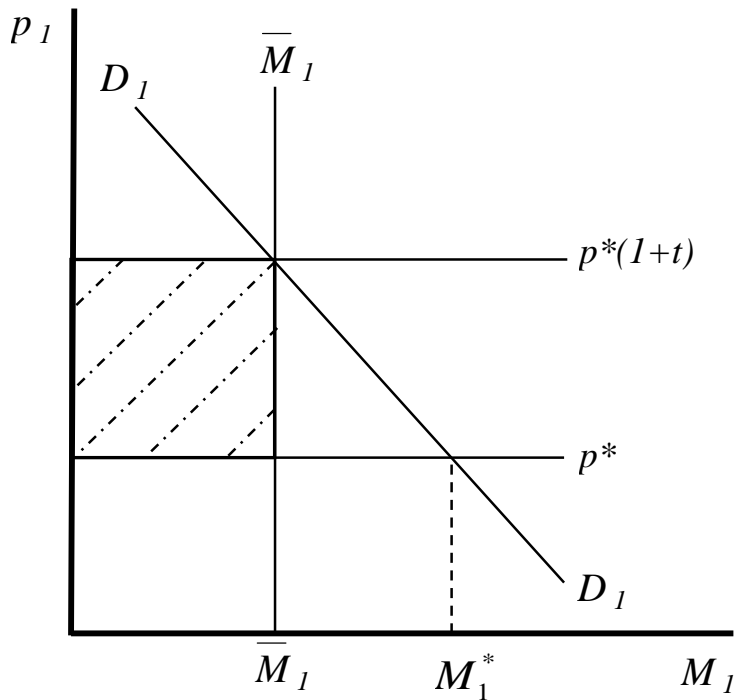
Suppose that a good is available from foreign suppliers at a fixed world price  $p^*$ . Domestic demand is negatively sloped.

In the case of a quota, that generates the same level of imports at the tariff  $t$ , the difference between the domestic demand price  $p$  and the world supply price  $p^*$  times the quota quantity is referred to as quota rent.

Figure 19.1

Figure 19.1

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1. Government prints licenses. Licenses are auctioned off to the highest bidder.

In a competitive environment, this should result in an outcome that is exactly the same as a tariff.

In equilibrium, the amount bid should equal the difference between the domestic demand price and the foreign supply price. Government collects the revenue, just like the tariff.

2. Government gives away the licenses to domestic firms based on some criteria. This results in the quota rents being given away to domestic firms, but at least they stay "in the country".

3. "Voluntary" export restraint. Our government tells the foreign government to limit exports, leaves it up to the foreign government to enforce the system.

In this case, the foreign export price is raised to our domestic price, and the quota rents are transferred to foreigners.

These voluntary exports restraints are common (or were in the 1980s).

The usual explanation is that they are sort of a political compromise.

The US (for example) wants to protect an industry that is in trouble, but a tariff or quota would invite retaliation from the foreign government.

The VER "buys off" the foreign government and foreign industry by transferring to them the quota rents.

4. Red tape. The government gives away licenses, but makes the procedure so difficult that the time and other expenses needed to get a license equals the difference between the domestic demand price and the foreign supply price.

Quota rents are then completely dissipated in wasteful activity. This activity is known as "rent seeking" or "DUPS" - directly unproductive activity.

Welfare analysis and division of welfare between factor income and rents

Suppose that the country produces only good  $X_2$  in the amount  $\bar{X}_2$ . It trades this for  $X_1$  at fixed world prices.

Suppose that preferences are Cobb-Douglas over  $D_1$  and  $D_2$ .

Since  $D_1$  is not produced domestically, we have  $D_1 = M_1$  where  $M_1$  is imports.

If  $t$  denotes the import tariff or tariff equivalent of a quota on good  $X_1$  and  $I$  denotes income, then preferences and the demand for imports (using earlier results) are given by:

$$U(D_1, D_2) = D_1^\alpha D_2^{1-\alpha} \quad D_1 = M_1 \quad M_1 = \frac{\alpha I}{p_1^* (1+t)} \quad (19.1)$$

Income  $I$  is given by the value of production of  $X_2$  at world prices plus tariff revenue.

Letting the world prices of  $X_1$  and  $X_2$  be equal to one, income is given by:

$$I = p_2^* \bar{X}_2 + p_1^* t M_1 \quad \text{let } p_1^* = p_2^* = 1 \quad I = \bar{X}_2 + t M_1 \quad (19.2)$$

Replace  $I$  in the right-hand equation of (19.1) with the right-hand equation of (19.2). Import demand is then:

$$M_1 = \frac{\alpha \bar{X}_2}{1+t} + \frac{\alpha t M_1}{1+t} \quad M_1^c \equiv \frac{\alpha \bar{X}_2}{1+t} \quad M_1^r \equiv \frac{\alpha t M_1}{1+t} \quad (19.3)$$

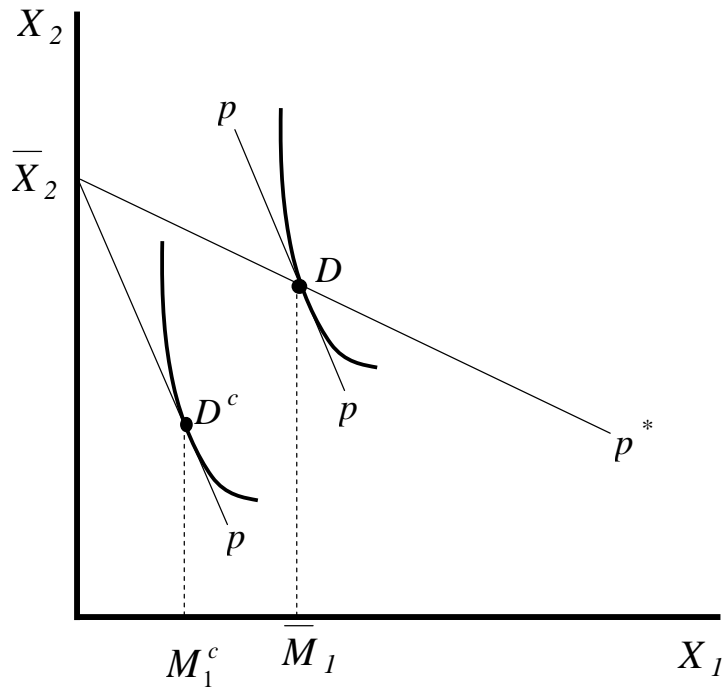
As indicated in (19.3), the first term can be thought of as imports by “consumers” paid for by factor income from producing  $X_2$  and is denoted  $M_1^c$ .

The second term is imports paid for by tariff revenue or quota rents by whomever gets that and is denoted  $M_1^r$ . P

Figure 19.2

Production is fixed at  $\bar{X}_2$ .

Figure 19.2





$D$  denotes total consumption:  $D$  is on the world price ratio through the production point but the marginal rate of substitution is the distorted domestic price ratio  $p = p^*(1 + t)$ .

$D^c$  in Figure 19.2 gives consumption out of factor income with imports given by  $M_1^c$  (middle equation in (19.3)); the difference between total imports  $M_1$  and  $M_1^c$  is imports paid for by tariff revenue or quota rents (right-hand equation in (19.3)):  $M_1^r$

Rearrange the first equation of (19.3) as follows.

$$M_1 - \frac{\alpha t M_1}{1 + t} = \frac{\alpha \bar{X}_2}{1 + t} \quad \frac{(1 + t) - \alpha t}{1 + t} M_1 = \frac{\alpha \bar{X}_2}{1 + t} \quad (19.4)$$

We then have an expression for imports as a function only of parameter values.

$$M_1 = \frac{\alpha \bar{X}_2}{1 + t - \alpha t} \quad \text{Imports fall with an increase in } t \quad (19.5)$$

Now divide the expression for imports out of factor income in (19.3) by total imports in (19.5). This gives us imports from factor income as a share of total imports. Subtracting this from one gives the share of imports from tariff revenue or quota rents.

$$\frac{M_1^c}{M_1} = \frac{1 + t - \alpha t}{1 + t} = 1 - \frac{\alpha t}{1 + t} \quad \frac{M_1^r}{M_1} = \frac{\alpha t}{1 + t} \quad (19.6)$$

The importance of tariff revenue or quota rents increases with the importance of the import sector as measured by the share parameter  $\alpha$ .

## Welfare rankings

- T tariff
- QA auctioned quota
- QG quota given to domestic firms
- VER voluntary export restraint
- RT Red tape

From domestic country's point of view

$$T = QA = QG > VER = RT$$

From foreign country's point of view

$$VER > T = QA = QG = RT$$

From world's point of view

$$T = QA = QG = VER > RT$$

Notes:

1. While QA and QG are in principle the same for total domestic income, the *distribution* differs.

Further QG quotas are sometimes instituted *solely for corrupt purposes*. They are instituted to give profits to the government's friends or buy off its enemies.

2. Another form of import licensing is exchange control. The country's currency is non-convertible, and importers must go to the central bank and make a request to buy foreign exchange.

Some types of goods are more "favored" than others (e.g., producer goods over consumer goods), so this is equivalent to some sort of quota system.

TABLE 16.1

## Average estimates of the annual costs of U.S. import protection, mid- to late-1980s (\$billions)

Product	Barrier	Consumer loss	Producer gain	U.S. DW loss	Revenues or rents	Foreign DW loss	U.S. welfare	Foreign welfare
Dairy products	Quotas	-5.50	+3.97	-1.40	+0.25(US)	-0.02	-1.28	-0.14
Sugar	Quotas	-1.30	+0.84	-0.30	+0.31(F)	-1.11	-0.46	-0.95
Automobiles	VERs	-5.80	+2.60	-0.70	+5.00(F)	-1.50	-3.20	+1.00
Machine tools	VERs	-0.54	+0.16	-0.20	+0.35(F)	na	-0.38	na
Carbon steel	VERs	-6.80	+3.80	-2.00	+2.00(F)	na	-3.00	na
Textiles and apparel	VERs	-27.00	+19.00	-5.50	+5.00(F)	-8.00	-8.00	-5.50
Lumber part 1	Tariff	-0.57	+0.41	-0.03	+0.34(US)	-0.05	+0.18	-0.26
Lumber part 2	Export tax*	-0.57	+0.41	-0.03	+0.34(F)	-0.05	-0.16	+0.08

Sources: G. Haufbauer, D. Berliner, and K. Elliot (1986), G. Hufbauer and K. Elliot (1994), J. de Melo and D. Tarr (1992), K. Maskus (1989), R. Feenstra (1992), and J. Kalt (1988).

Note: For purposes of calculating deadweight losses, estimated revenues or rents were divided equally between a higher U.S. price and a lower foreign price, except in the case of lumber. The export tax in "Lumber Part 2" refers to a Canadian tax on its exports of lumber to the United States.

Table 1. *Measured cheese import quota rents and their component parts, selected industries, (constant \$1980)*

Industry and year	Total rent $x + m + t$	Importer's rent $m$	Exporter's rent $x$	Tariff revenue $t$	Export subsidy $s$
\$ per pound:					
<i>Blue-Mould, Italy</i>					
1980	1.22	0.33	0.60	0.29	0.28
1979	1.27	0.40	0.58	0.28	0.24
1978	1.14	0.40	0.46	0.27	0.14
1977	1.50	0.40	0.82	0.29	-0.01
1976	1.38	0.35	0.73	0.30	-0.03
1975	1.36	0.31	0.77	0.28	0.16
1974	1.05	0.26	0.56	0.23	0.11
<i>Blue-Mould, Denmark</i>					
1980	0.23	-0.01	0.02	0.22	0.29
1979	0.32	0.02	0.06	0.23	0.38
1978	0.33	0.04	0.06	0.24	0.31
1977	0.37	0.05	0.09	0.23	0.18
1976	0.39	0.05	0.09	0.24	0.09
<i>Edam and Gouda, The Netherlands</i>					
1980	0.54	0.04	0.29	0.21	0.32
1979	0.78	-0.03	0.59	0.22	0.44
1978	0.83	0.00	0.58	0.25	0.34
1977	0.83	0.10	0.47	0.26	0.18
1976	0.80	0.01	0.53	0.26	0.08
1975	0.80	0.06	0.50	0.24	0.21
1974	0.53	0.03	0.30	0.20	0.20
<i>Italian IOL, Italy</i>					
1980	1.83	1.15	0.32	0.36	0.85
1979	1.82	0.93	0.38	0.51	0.76
1978	1.54	0.31	0.70	0.53	0.62
1977	1.93	0.90	0.55	0.47	0.41
1976	1.79	0.63	0.67	0.48	0.31
1975	1.65	0.57	0.62	0.45	0.33
1974	1.35	0.39	0.51	0.45	0.16